USE OF INFORMAL NETWORKS TO RESOLVE LOGISTICS-RELATED ISSUES IN HUMANITARIAN ASSISTANCE DISASTER RESPONSE

GRADUATE RESEARCH PROJECT

Yira Y. Muse, Major, USAF

AFIT-ILS-ENS-11-09

DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY

AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

AFIT/ILS/ENS/11-09

USE OF INFORMAL NETWORKS TO RESOLVE LOGISTICS-RELATED ISSUES IN HUMANITARIAN ASSISTANCE DISASTER RESPONSE

GRADUATE RESEARCH PROJECT

Presented to the Faculty

Department of Operational Sciences

Graduate School of Engineering and Management

Air Force Institute of Technology

Air University

Air Education and Training Command

In Partial Fulfillment of the Requirements for the

Degree of Master of Science in Logistics Management

Yira Y. Muse

Major, USAF

June 2011

AFIT/ILS/ENS/11-09

USE OF INFORMAL NETWORKS TO RESOLVE LOGISTICS-RELATED ISSUES IN HUMANITARIAN ASSISTANCE DISASTER RESPONSE

Yira Y. Muse,

Major, USAF

Approved:

//SIGNED//	14 June 2011
Dr. Sharon G. Heilmann, Lt Col, USAF (Advisor)	date

Abstract

The social dynamics of informal networks are not well understood in the context of Humanitarian Assistance/Disaster Response (HA/DR). Informal networks are what personnel typically rely on when formal organizational barriers constrain their ability to accomplish the mission. This study examines the use of Informal Networks to resolve logistics-related issues faced by Air Forces Special Operations Command (AFSOC) and Air Forces Southern (AFSOUTH) during their HA/DR to the Haiti Earthquake of 2010. A Content Analysis was conducted of the logistics-related Lesson Learned (LLs) reports submitted by these organizations. The purpose was to determine if there exist any patterns in the LLs that identify situations where it is more beneficial to leverage Informal Networks than to rely on the existing Formal Networks, and to provide insight into the Informal Networks present throughout disaster response organizations. The results suggest that Informal Networks provided successful resolution of issues more often than Formal Networks and they were also used more often than Formal Networks.

Hopefully, such insight will enable Air Force leaders to improve their organizational communication during disaster response by properly leveraging their units' Informal Networks.

Table of Contents

List of Figures

List of Tables

USE OF INFORMAL NETWORKS TO RESOLVE LOGISTICS-RELATED ISSUES IN HUMANITARIAN ASSISTANCE DISASTER RESPONSE

I. Introduction & Background

On, 12 January 2010, at 1653L (2153Z), Haiti was struck by a 7.0 magnitude earthquake, the strongest recorded earthquake in 240 years. The center of the quake occurred 15 miles away from the highly populated capital city of Port-au-Prince. It was followed by 33 aftershocks ranging in magnitude from 4.2 to 5.9 on the Richter scale. Over 220,000 people were killed, not including those who later died from injuries, making this quake one of the top ten worst disasters in the past 1,500 years. One million people lost their homes and nearly three million people were in need of immediate aid (HQ AFSOUTH/A9L, 2010).

The very nature of disasters complicates attempts at HA/DR efforts to the affected area. Both natural and man-made disasters are complex, chaotic, dynamic and uncertain. To add salt to the wound, basic infrastructure, communication towers, electrical towers, roads, bridges, etc., are often some of the first casualties of a disaster (Garnett & Kouzmin, 2007). Providing relief is primarily a matter of being able to transport supplies (most notably, food and medical) to the area as quickly as possible.

This is challenging at best but in impoverished Haiti, where the infrastructure was already meager and decrepit prior to the earthquake, it was near impossible. Roads leading in or out of the capital were severely damaged or obstructed, making land transport problematic. The earthquake destroyed Haiti‘s seaport cargo handling structures and damaged Port-au-Prince‘s only airport, Toussaint L’Ouverture International. Before the quake, the airport had only limited capacity, averaging 15-25 flights per day on a single runway. The quake destroyed the air traffic control tower, the

passenger terminal, and airfield lighting. None of the smaller airstrips in the country could handle large cargo relief aircraft or equipment (HQ AFSOUTH/A9L, 2010).

Into this chaos, United States Southern Command (USSOUTHCOM), the organization charged with oversight of U.S. military actions in most of the geographical area south of the continental U.S., sent forces to establish security and a working airport, the very first steps necessary for relief support. Forces were requested from U.S. Special Operations Command (USSOCOM) who tasked Air Forces Special Operations Command (AFSOC) to deploy the 1st Special Operations Wing (1 SOW) to Haiti.

1 SOW arrived in-country on 13 Jan and gained control of the airfield within 30 minutes, allowing for the first of the relief supplies to enter the country later that day. The first of AFSOUTH's forces arrived in Haiti 7 hours later (see Appendix A for timeline). For the following two weeks, the forces of these two organizations would work with each other and with fellow government, civil, and international relief agencies to provide aid to the citizens of Haiti.

To do this, they would work primarily through their Formal Networks, the official Command and Control (C2) organizational structure established to take well-rehearsed action and perform the tried and true procedures specific to HA/DR (Appendix B). When that failed, they would turn to their Informal Networks.

The social dynamics of Informal Networks are not well understood in the context of Humanitarian Assistance/Disaster Response (HA/DR). During the 2010 Logistics Officers Association National Conference, U.S. Southern Command commander, Gen Douglas Fraser, commented that, "though we have all these processes in place, it seems like its still always some chief that works the deal in the back shop to get the stuff we

need". He was referring to the use of Informal Networks, in place of Formal Networks ("processes"), to accomplish the mission. These Informal Networks are what personnel typically fall back upon when formal organizational barriers constrain their ability to accomplish the mission. The question remains whether leveraging these networks actually is more successful than following established formal processes, as Gen Fraser suggested.

To investigate this question, the researcher conducted a Content Analysis of the logistics-related Lessons Learned (LLs) submitted by the major U.S. Air Force forces that performed HA/DR actions for the Haiti Earthquake of 2010. This HA/DR was a joint, multi-national, interagency and whole of government effort orchestrated by the Joint Task Force-Haiti (JTF-H), under the auspices of the U.S. Southern Command (USSOUTHCOM).

The purpose of this research was to determine if any patterns exist in the LLs that identify situations where it is more beneficial to leverage Informal Networks than to rely on the existing formal networks, and to provide insight into the informal networks present throughout disaster response organizations. The focus was the use of informal networks to resolve logistics-related issues by Air Forces Special Operations Command (AFSOC) and Air Forces Southern (AFSOUTH).

II. Literature Review

Formal Networks

Formal Networks are often described as the relationships required of people in an organization in order for them to accomplish interdependent tasks, or meet organizational goals according to established organization processes (Scott, 2000). Alternatively, a set of formally defined relationships occurring between supervisors and subordinates or among peers (Lincoln & Miller, 1979). Knost (2006) provides useful examples of such networks: marketing department personnel who are required to obtain approval from the legal department before running a new advertising campaign or architects who must consult with engineers before starting building construction.

Leaders and managers often attribute their own success to the availability of their resources. When a leader does not know what to do, or does not possess the necessary skills to resolve an issue, it is their access to resources that do contain the knowledge or possess the skills that allows them to meet that challenge. For example, Cross, Parker, Prusak and Borgatti (2001) found that when managers had at least a semi-accurate understanding of their contacts' expertise, those contacts provided a critical extension to their own knowledge. That understanding typically comes from having a relationship to one's contacts. Such relationships make up an informal network.

Informal Networks

The utility of informal networks comes in leveraging naturally occurring relationships, such as gaining or maintaining social capital and in communities of practice, where a tightly-knit group that share a common practice benefit from joint sense-making and problem solving (Wasko & Faraj, 2005). This provides an advantage

over the structured artificiality of a hierarchy-driven communication flow, where communities are created and individuals are forced to join them (Nirmala & Vemuri, 2009). Such a community is typically represented by a structural diagram of an organization's functions, which may or may not provide clear indication of the kind of information each function possesses. Knowing precisely who to go to for specific information is more direct and efficient than trudging through the established lines and nodes of communications to eventually, or maybe never, get the necessary response.

Informal networks are typically most useful to organizations when they extend beyond the organization itself. These external, or *weak* ties, have been identified as being even more critical to information transfer than strong ties, since they tend to bring novel ideas from the outside into the group (Granovetter, 1973). Strong ties, on the other hand, serve more to maintain the status quo and reinforce the knowledge the group already has. Both strong and weak ties occur between nodes. Combined, these interpersonal ties and their respective nodes make up the informal network.

One of the strengths of informal networks is also one of the greatest weaknesses: critical nodes. The critical nodes, or people, of the network are often linchpins, as in when they leave the network they leave behind gaping holes in informational knowledge. This is the case when organizations are downsized or restructured, or when those critical people retire (Von Stamm, 2005). Suddenly, lines of the informal network are severed, leaving many others cut off, literally and figuratively, from valuable sources of information. Unfortunately, it is only then that we become aware of the impact and importance of the informal network. Hypothetically, if an organization's leaders had

insight of the informal networks that exist throughout it, they could avoid the negative effects of such a gap in knowledge.

In the event of disaster, informal networks take on heightened importance. For example, after Hurricane Katrina struck New Orleans in 2005, disaster victims found informal networks to be invaluable specifically because the established infrastructure (communication, roads, airports access to food, water, shelter) either broke down or became unavailable when flooding forced agencies to relocate to other cities. These informal networks, consisting mainly of relatives, friends and unknown others, provided critical resources including boats, guns for safety, vehicles, food, shelter and work office space (Davis, 2010).

From the responders' perspective, it seems that Informal Networks are the way things *actually* get done. To paraphrase General Fraser, Commander of USSSOUTHCOM, speaking at the Logistics Officers Association National Conference of 2010, 'though we have all these processes in place, it seems like it still always takes some chief that works a deal in the back shop to get the stuff we need'.

Information Sharing in Disaster Response

Information Technology (IT) has long been touted as a panacea to information sharing and coordination efforts. However, IT's benefits are best realized away from the disaster area itself, in a control center or response team headquarters. In a disaster situation, the infrastructure that enables IT is often one of the first casualties. The terrorist attacks on 9/11 and Hurricane Katrina are clear examples of this: in both situations, communications infrastructure was either destroyed, damaged, overwhelmed or "made useless by water, winds or mismanagement" (Garnett & Kouzmin, 2007, p.

178). To multiply this effect, much of the communications technology that was still available to response agencies near New Orleans after Hurricane Katrina was not interoperable; some agencies could neither communicate with their own personnel in different locations nor across other organizations (Garnett & Kouzmin, 2007).

Studies on communication in disaster or crisis response often highlight one key obstacle in information sharing. Although most agencies, stakeholders, and response teams agree information sharing is important to accomplish overall objectives, most were overly concerned with *receiving* that information from others and almost thoroughly neglected efforts in *providing* information to others (Bharosa, Lee & Jansen, 2009). This is where information sharing could stand to benefit from leaders who know how to manage informal networks -- in finding ways to encourage behaviors or clear obstacles towards this kind of knowledge reciprocation. Information is one of the key resources individuals and organizations utilize to meet their objectives, especially in HA/DR situations, when resources in general are scarce.

Social Capital

Perhaps an inroad to encouraging this kind of reciprocal behavior lies in theories of social capital. Social capital refers to social network connections. Lin (2001) defines it as resources embedded within social structure that a person accesses with the intent of gaining a better outcome. Distinguishing it from other forms of capital, Putnam (1995) claims that social capital resides in the fabric of relationships between individuals and their connections to their community, versus residing in assets or individuals. It has also been viewed as a framework for understanding the creation and sharing of knowledge in organizations (Nahapiet & Ghoshal, 1998).

These general concepts of social capital have been used to explain why people offer their knowledge and assistance to others, and participate in knowledge-sharing groups such as communities of practice. Wasko & Faraj (2005) found that individuals who thought their professional reputations would benefit from contributing knowledge were more likely to contribute. Even in electronic network settings, people were motivated to share useful advice if they perceived this sharing as an opportunity to improve their reputation (Constant, Sproull & Kiesler, 1996). There is also evidence of a sense of reciprocity at work; Nahapiet & Ghoshal (1998) also found that at the individual level, people tend to share knowledge when they think their contribution will be worth their effort and when they think they will create some greater value for themselves as a result.

Research Questions

The objective of this research is to determine if, when and how successfully Informal Networks are used to resolve logistics-related issues in HA/DR. This objective is met by answering the two basic research questions below.

1. Does use of Informal Networks resolve logistics-related issues more often than use of Formal Networks in HA/DR?
2. Are Informal Networks used more often than Formal Networks to resolve logistics-related issues in HA/DR?

III. Methodology

Research Focus & Access

The researcher limited this study to the Joint Lessons Learned Information System's (JLLIS) repository of Haiti Earthquake Relief/Operation Unified Response After Action Reports (AARs), Commander Directed Reports (CDRs), and LLs submitted by AFSOC and AFSOUTH. The reports used came from the U.S. Southern Command LL Webpage, which acts as a centralized location for information supporting the Haiti Earthquake Relief effort (https://www.jllis.mil/jscc/speciality.cfm?disp=site.cfm&&ssiteid=175). The researcher gained access to this site, and all JLLIS sites, via a '.mil' capable computer at the Air Force Institute of Technology. Using keyword searches, and searches for related communities of practice, the researcher was able to locate the reports mentioned above. The main source of access to report was through the JLLIS Interagency Portal, https://www.jllis.mil/jscc/index.cfm?menudisp=menu.cfm&st1clear=true, from which one can navigate to the 'SOUTHCOM' page and further navigate to the 'Operation Unified Response' LL webpage mentioned above.

Sampling

The criteria used to select a sample of reports from the population of JLLIS LLs on the Haiti Earthquake Relief/Operation Unified Response Library were as follows: (1) reports had to come from responding U.S. Air Force units, and (2) reports had to pertain to logistics-related issues, as identified by those units.

The Air Force forces tasked by USSOUTHCOM to respond to the Haiti Earthquake were AFSOC or AFSOUTH. Their sub-units/organizations submitted the

LLs used in this study (e.g., 1 SOG, AFSOUTH A3). In their AAR and CDR, AFSOC categorized their primary logistics-related issues under 'Sustainment', while AFSOUTH categorized them as 'Agile Combat Support'. Both categories pertain to logistics support critical to mission accomplishment.

Research Design

This qualitative research was conducted via coding and analysis of LLs submitted by the responding units of AFSOC and AFSOUTH--regarding the planning and execution of the HA/DR to the Haiti Earthquake of January 2010. A Mixed-methods approach was used, borrowing applications from two main research methods to produce a unique whole. Coding, as typically applied in Grounded Theory, was used to discover the categories to be analyzed in Content Analysis. Content Analysis was used to identify patterns and themes in the coded data.

Coding

Coding consists of assigning "a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data" (Saldaña, 2009, p. 3). Coding can consist of as many iterations as a researcher feels is adequate but typically consists of two major cycles, First and Second, described below.

These two cycles of coding were conducted to draw out the themes and trends of the JLLIS reports in this study. However, prior to the First Coding Cycle of *all* reports included in this research, the researcher needed to determine which words or phrases were appropriate to use as codes for this study. To this end, the researcher conducted a manual, line-by-line review of three (3) reports considered representative of the LLs in

the Haiti/OUR JLLIS Library. This revealed the recurrence of many Information-, Collaboration- and Organization-related themes pertinent to this study.

To provide inter-researcher reliability, the researcher had four classmates individually code those same representative reports. These coders represented a cross-section of the Logistics Science Intermediate Developmental Education program at AFIT. All were Active Duty Air Force Majors. Three of the coders were male, one was female. The males included one Aircraft pilot, and two Logistics Management Officers. The female was a Maintenance Officer. Their general experiences in the Air Force, their career fields and their participation in the Logistics Management program gave them the conceptual framework to interpret the text, identify themes and code the LL reports.

The coders were purposefully given brief instruction in how to code and what themes to look for. This led to the selection of the words and phrases later used as the coding structure for coding the remaining reports in the study. In order to later make valid inferences from the text, it is important that the classification, or coding, procedure be reliable in its consistency—different people should code the same text in the same way (Weber, 1990). To determine this consistency, kappa coefficients were calculated using the NVivo9 content analysis software. The results are tabulated in Appendix C and discussed in Chapter III.

First Cycle Coding (Open, In Vivo & Process Coding)

Open coding (also referred to in the literature as Initial Coding) (Saldaña, 2009) consists of fastidiously reading a document or report line-by-line, word-by-word to uncover tentative concepts and categories that fit the data (Berg, 2007). The results of open coding are usually numerous and varied codes, which are later knit together into

overarching, and sometimes overlapping, themes during focused coding (Lofland, Snow, Anderson & Lofland, 2006). For this study, open coding consisted of a line-by-line review of the reports listed in Table 1.

Table 1. Source Documents

Source	Lessons Learned Identifier	Codes	References
AFSOC_A4 – Sustainment	ID37407	11	20
AFSOC_Selfsustaining Logistics & Weather Support	ID38010	40	136
AFSOC_AFSOC Command and Control (C2) integration	ID37394	15	65
AFSOC_Joint Ops with USG & NGOs is an Enduring Critical Capability	ID38015	27	107
AFSOC_Field Water	ID37999	9	17
AFSOC_Mortuary Affairs	ID37981	11	25
AFSOC_SelfSustainment	ID37969	6	12
AFSOUTH_820th was late to need	ID37834	6	7
AFSOUTH_Base Operating Support (BOS) for EMEDS Inadequate	ID37645	13	25
AFSOUTH_Daily review of Time Phased Force & Deployment Data (TPFDD)	ID38093	5	7
AFSOUTH_ForceFlow out of sequence	ID38092	8	19
AFSOUTH_Joint Personnel Recovery Center requires Interagency	ID37445	7	8
AFSOUTH_Lack of Visibility on Platforms	ID37625	9	12
AFSOUTH_Meals-Ready-to-Eat distributed vice Humanitarian-Daily-Rations	ID37835	7	8
AFSOUTH_No Safety Officer	ID37896	3	3

Saldaña (2009) suggests that In Vivo Coding and Process Coding lend themselves particularly well to Open Coding. In Vivo Coding is a method of extracting indigenous terms as a word or short phrase directly from the actual language in the qualitative data record. In Vivo Codes can provide a crucial check on whether a researcher has grasped what is significant to the participant/report writer, and can help "crystallize and condense meanings" (Charmaz, 2006, p. 57). However, researchers must be wary of overdependence on this method as it can limit one's ability to transcend to higher conceptual and theoretical levels of thought (Saldaña, 2009).

Process Coding uses gerunds, words that end in "-ing", to connote action in the data (Saldaña, 2009). Corbin & Strauss (2008) describe Process Coding as a search for ongoing action/interaction/emotion taken in response to situations, or problems. Process Coding can occur simultaneously with both First and Second Cycle Coding (Saldaña, 2009).

The researcher used both In Vivo Coding and Process Coding, along with Open Coding, during First Cycle Coding. In Vivo Coding was deemed appropriate in order to honor the sometimes opinionated nature of LLs. The researcher felt it was important in these instances to refrain from overly interpreting the emotion-laden words some report writers used in their LLs, in an effort to keep from introducing bias. Process Coding was used out of an opinion that it best reflected the intent behind the research questions, since the questions are based on the reaction to some input (i.e., input: no formal guidance was issued; reaction: informal network activated) and on the appropriateness of responses or solutions. Open Coding was used to discover concepts and patterns in the data. Also, the researcher concluded that it was best to conform to the instruction of experts in the field, such as Saldaña (2009), who suggests using these methods in concert, but not necessarily at the exclusion of other coding methods.

For this study, two major iterations of Open Coding occurred. After the first iteration, the researcher discovered that some concepts had been prematurely combined and had to go back to fracture (or split) those concepts into single concept codes. For example, the coded concept 'Lack of Formal Coordination' was fractured into the concept codes 'Lacking', 'Formal' and 'Coordination'. Later, these codes can then be easily re-combined, or intersected for analysis.

The research questions helped the researcher determine which codes were relevant to the study. It is ultimately up to the researcher to decide which codes and coded data to later analyze, and which to dispose of, or save for a future research project. For example, the researcher filtered out extraneous codes that did not pertain to the study's purpose such as 'Social Media' and 'Rebuilding' and replaced free codes of similar meaning with encompassing codes, as in the merger of 'Cooperation' and 'Collaboration'. This particular merger was delicate because these two words, as well as 'Coordination', are often used interchangeably.

The researcher consulted the Merriam-Webster Dictionary Online to resolve this dilemma and discovered that 'Cooperation' and 'Collaboration' are synonyms having to do with working jointly with others for mutual benefit whereas 'Coordination' involved harmonizing and putting things in order (www.merriam-webster.com). The researcher decided to use the code 'Cooperation' since it has less sinister connotations than 'Collaboration'. Subsequently, all text previously coded at 'Collaboration' was re-coded at 'Cooperation'. Text coded at 'Coordination' were left unaltered.

In selecting these initial codes, the researcher was able to winnow out the less descriptive and analytically useful ones, a process which led to Second Cycle Coding (Lofland, et al, 2006).

Second Cycle Coding (Pattern Coding), aka Axial Coding

Saldaña (2009) states that the goal of Second Cycle Coding is to develop a sense of categorical, thematic, conceptual, and/or theoretical organization from the array of First Cycle codes. In Second Cycle Coding, the codes from the First Cycle are reorganized and reconfigured to develop an even smaller, more select list of broad

categories, themes and/or concepts. Pattern Coding in particular, is used to develop a "meta-code", or category label, that identifies and organizes similarly coded data, and attempts to give meaning to the organization (Saldaña, 2009).

Pattern Codes identify an emergent theme, configuration or explanation and merge data into a more meaningful and parsimonious unit of analysis (Miles & Huberman, 1994). Pattern Coding is considered especially applicable to the second cycle of coding; the development of major themes from the data; the search for rules, causes and explanations in the data; the formation of theoretical constructs and processes (e.g., "negotiating", "bargaining"); and examining social networks and patterns of human relationships (Miles & Huberman, 1994). The last three in this list were pertinent to this research, leading to the selection of Pattern Codes for Second Cycle Coding in this study.

The researcher used the Pattern Codes, or concepts, that occurred most frequently in First Cycle Coding, to develop the Categories and Coding Framework listed in Table 2, below. These codes were then used in further Content Analysis.

Table 2. Coding Framework

Category	Subcategory	Sub-subcategory
1. Formal		
2. Informal		
3. Triggers		
	3.1 Urgent Need	
	3.2 Coordination (lack of)	
		3.2.1 Faulty Org'l Processes *
	3.3 Proper Planning (lack of)	
		3.3.1 Faulty Org'l Knowledge *
	3.4 Formal Guidance (lack of)	
	3.5 Communication (lack of)	
	3.6 Own Resources (lack of)	
		3.6.1 Functional Gap in Formal Network *
	3.7 Agreement (lack of)	
	3.8 Use of Informal Network as Part of Mission	
4. Logistics		
5. Networking		
	5.1 Communication (functional)	
	5.2 Cooperation (functional)	
	5.3 Coordination (functional)	
	5.4 Evidence of Formal Networking	
	5.5 Evidence of Informal Networking	
	5.6 Information Sharing	
6. Organization Structure		
7. Taking Action		
	7.1 Improvising	
	7.2 Informal actions enabling Formal actions	
		7.2.1 Assuming Responsibility *

* Instances of coding at these sub-subcategories were subsumed by the parent subcategory for ranking purposes

Key Themes in the Second Cycle

Second Cycle Coding focused on Pattern Codes of the following major themes:

- Instances of Formal Networking (e.g., following the official LOCs, C2 structure)

- Instances of Informal Networking (e.g., going outside official LOCs, or structures)
- Evidence of Formal Coordination, Cooperation or Partnership
- Evidence of Informal Coordination, Cooperation or Partnership

Content Analysis

Content Analysis is a research method where a set of procedures is used to make valid inferences from text about the sender(s) of a message, the message itself, or the audience of the message. Of particular interest to this study, Content Analysis can be used for the purposes of: identifying a communicator's intentions and related characteristics; describing attitudinal and behavioral responses to communications; reflecting cultural patterns of groups, institutions and societies; and describing trends in communication content (Weber, 1990).

Content Analysis is conducted through the use of coding frames which are used to organize the data and identify findings after open coding has been completed (Berg, 2007). As previously alluded to, the process of data-reduction, or classifying words of text into fewer content categories through the development of coding frames, presents concerns with the consistency or reliability of the classifications themselves. These reliability issues are usually due to ambiguity of word meanings and category definitions (Weber, 1990). This is why multiple coders were used to corroborate the researcher's coding classifications in First Cycle coding (see Inter-coder Agreement, Appendix C).

The Content Analysis focused on themes of: evidence of informal network use; reasons, or "triggers" that led to use of informal networks; success or failure of the informal networks. A description of the analysis follows in Chapter IV.

In order to accomplish a cross-case analysis, the subcategories under the Triggers category were ranked according to importance. Put another way, if they possessed the necessary ability, which of these 'Triggers' would HA/DR-experienced individuals eliminate first? And then, which would they eliminate second, and so on.

The HA/DR-experienced individuals in this case where the USSOCOM Deputy J33 (Operations) and his planning staff that worked on the Crisis Action Team during the Haiti response in question. Their conclusion was as follows:

1 – Urgent Need

2 – Lack of Coordination

3 – Lack of Proper Planning

4 – Lack of Formal Guidance

5 – Lack of Communication

6 – Lack of Own Resources

7 – Lack of Agreement

A ranking of 1 meant a Trigger was the most important to eliminate. A ranking of 7 meant it was the least important (Trigger 3.8 Use of Informal Network as Part of Mission was not ranked for reasons explained in Ch IV). In events where more than one trigger was identified, the highest ranking trigger was recorded and used in cross-case analysis. How the rankings applied to each event is shown in Appendix D.

NVivo9 by QSR International

The researcher performed the coding and Content Analysis with the use of the NVivo9 content analysis software developed by QSR International (available on-line at www.qsrinternational.com). NVivo9 allows for efficient data mining, coding for key

themes and data-reduction into categories. The researcher can then identify links and patterns among the events and organizations in the disaster response C2 network for further analysis.

An example of one such tool, a Tree Map of the data, is displayed below, Figure 1. Tree Maps are one NVivo9 method researchers can use to visualize patterns or relationships in their qualitative data. The size of the boxes represents how frequently the categories named are coded across the LLs.

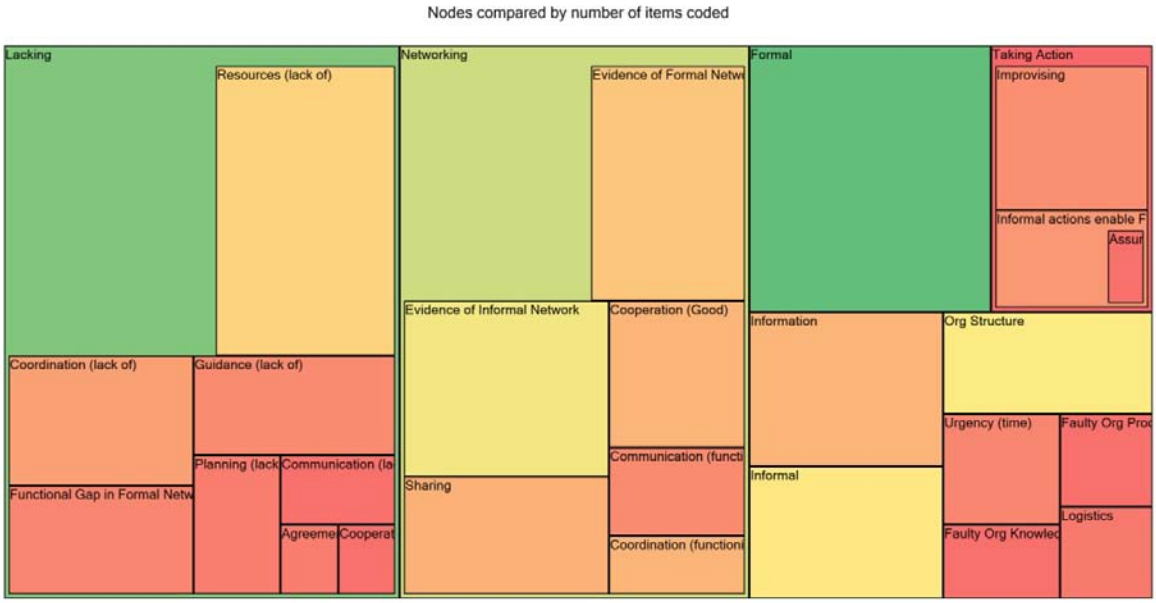


Figure 1. Tree Map of Coding Framework

Reliability & Validity

Reliability

Three types of reliability are especially pertinent to Content Analysis: stability, reproducibility, and accuracy. These are all functions of the agreement achieved among

observers, coders, judges, or measuring instruments, but are determined in different ways. (Krippendorf, 2004).

Stability

Krippendorf (2004) defines Stability as the degree to which a process is unchanging over time. It can be determined when the same content is coded more than once by the *same* coder. Unreliability occurs when intraobserver inconsistencies are present, making Stability the weakest form of reliability, since it involves only one coder (Weber, 1990).

Reproducibility

Inter-coder Agreement

Reproducibility is the degree to which a process can be replicated by different analysts working under varying conditions, locations or using different but functionally equivalent measuring instruments (Krippendorf, 2004, p. 215). This involves more than one coder--giving it the alternate names of intercoder reliability or intersubjective agreement--and unreliability occurs when there are both intra- and inter-observer disagreements. These disagreements often result from cognitive differences among the coders, ambiguous coding instructions, or from random recording errors (Weber, 1990, p. 17).

High reproducibility is a minimum standard for content analysis, and it was initially achieved in this study during the first cycle of coding. In the first cycle, three classmates from different Air Force backgrounds and career-fields performed Open Coding of three representative LLs (ID38010, ID37395, ID38015). Given their Air Force commonality, it was unsurprising that they coded the reports similarly; the same concepts

were repeated throughout. However, the 3 'loggies' lent the researcher the perspective that the issues in the reports were often a result of the lack of supply, equipment or manpower. This perspective heavily influenced the researcher during Second Cycle coding and led to the development of the "Lack of…" categories.

Open Coding produced nearly 200 'free' codes, which were then reduced and filtered according to their relevance in this study. This resulted in 90 codes, which were then further reduced into what became the Coding Framework used for recoding the LLs in Second Cycle coding. The codes that later became the Coding Framework in Table 2 are listed alphabetically in Appendix C, along with the Kappa coefficient and Agreement percentage. Kappa coefficients indicate complete coding 'agreement' with a kappa=1, and 'no agreement' with $k \leq 0$ (other than what would be expected by chance). To gain some additional insight, Agreement percentage was also used.

In general, an Agreement percentage of 80% or more is considered acceptable in most situations, as are Kappa coefficients of .80 or greater (Lombard, Snyder-Duch & Bracken, 2010). All codes selected for the remainder of First Cycle and all of Second Cycle coding had calculated Agreement percentages of 84% and above. The codes with Kappa coefficients less than zero ($k<0$), and most of the codes with coefficients equal to zero ($k=0$) or less than .80 ($k<0.80$) were later determined to be either compound concepts, that should have been coded as fractured concepts (see Chapter III for discussion of premature combination of concepts) or concepts with differing interpretations (e.g., Coordination, Informal and Formal).

Accuracy

Finally, Krippendorf (2004) defines Accuracy as the extent to which a process conforms to its specifications and yields what it is designed to yield. In order to determine Accuracy, analysts must obtain data under test-standard conditions, meaning established procedures that are taken to be correct. Disagreements are caused by intra- and inter-observer inconsistencies as well as by deviations from a given standard. Though it is the strongest form of reliability, it is not typically used in research outside of training purposes. This is due to the nature of content analysis which uses inferences and interpretations to form the analysis (e.g., coding of concepts, categorization). Inferences and interpretations can differ from person to person and therefore have no concrete standard by which Accuracy reliability could be properly measured.

Validity

Face Validity

The face validity of a category is the extent that it appears to measure the construct it is intended to measure. According to Weber (1990), content analysts have often relied too heavily on face validity. However, Krippendorf (2004) calls face validity the gatekeeper for all other kinds of validity; findings must not violate 'common sense'.

We discuss face validity as it relates to this study because it *is* so frequently relied upon in content analyses (Krippendorf, 2004). Content analysis is fundamentally concerned with readings of texts, meaning of symbols and interpretation of images, all of which are rooted in what a particular culture would know as 'common sense' (Krippendorf, 2004). This research depended on a shared understanding of text, symbols and images within our Air Force culture. And, it depended on that culture's common understanding that LL reports are a reliable way to learn about the problems that occur

during an operation, to include issues with formal C2 networks, communication, or logistics. As such, this study achieved face validity by analyzing LL reports from the Haiti Earthquake response to determine if, when and how departures from the formal C2 network occurred and if the resultant actions led to the resolution of logistics-related issues.

Internal Validity: Pattern Matching

Pattern matching can help strengthen the internal validity of a study (Yin, 2009). In this research, the pattern matching procedure applied was that of detecting patterns of 'triggers' in the reports and seeing how they matched to the choice of network used across different logistics-related events and between two different organizations. Patterns of information sharing were also detected and matched to the type of network they occurred in across the same events and organizations. This pattern matching logic was then used to deduce possible explanations based on those emerging patterns in the data.

External Validity

Weber (1990) asserts that strong validity can be obtained by comparing content-analytic data with certain external criterion. He classifies four types of external validity as pertinent to content analysis: Predictive, Hypothesis, Construct and Semantic.

Content-analytic data seldom have the first, predictive validity, where forecasts about events or conditions external to the study are shown to correspond to actual events or conditions (Weber, 1990). This type of generalizability does not apply to the purposefully scoped nature of this research, so it is easy to determine that this study does not have or require predictive validity. Neither does it have the second, hypothesis validity, which pertains to the relationship of a measure to other variables (Weber, 1990).

If the measure "behaves" as expected in relation to those other variables, it has hypothesis validity.

Construct Validity

A measure has construct validity to the extent that it relates to other measures of the same construct (Krippendorf, 2004, Neuendorf, 2001, Weber, 1990). Krippendorf (2004) makes a point of calling this *structural* versus *construct* validity in order to differentiate its meaning in content analysis from the slightly different meaning it has in psychological test literature. Yin (2009) suggests several tactics to increase the construct validity of a study; the researcher employed one of those tactics, "maintain a chain of evidence".

Chain of Evidence

Maintaining a chain of evidence increases the reliability of the information in the study and allows an external observer to follow the derivation of the evidence from initial research questions to final study conclusions (Yin, 2009).

The researcher maintained this chain via the applications of the NVivo9 software and through the use of a Microsoft Excel spreadsheet. The NVivo 9 software allowed the researcher to avoid any loss of data, or evidence, through carelessness or bias. The software also conveniently stores the evidence in searchable database-like form making it easy for an external observer to investigate the actual data, and relevant meta-data (e.g., time, place, reporting organization).

In terms of this study, an external observer could follow the chain in this way: the observer could ask one of the research questions on use of informal networks, go into the

NVivo9 project for this study, select the term ‘Evidence of Informal Networking’, and the software would show every instance of informal networking coded by the researcher. The observer could also filter those instances by trigger, for example by ‘Lack of Resources’, and match those events to the Microsoft Excel spreadsheet indicating success or failure of the network to compensate. The success/failure indications on the spreadsheet can also be seen in the text itself.

Semantic Validity

When words, or coding units, that are classified together have similar connotations, their classification is said to have semantic validity (Weber, 1990). Krippendorf (2004) adds that semantic validity exists when persons familiar with the language and texts examine lists of words (or other units) placed in the same category and agree that these words have similar meanings or connotations.

Semantic validity was achieved in this study through the use of multiple coders during Open Coding to determine inter-coder agreement. The coders used similar words and phrases to describe similar meanings in the texts they coded. This can be seen in the Inter-coder Agreement tables in Appendix C.

IV. Results & Analysis

The researcher originally tabulated the data into a Microsoft Excel spreadsheet (Appendix D) and then transferred it to SPSS 16.0 for further data analysis. Cross-case analysis results are tabulated in Tables 3, 4 and 5 below. The final phase of Axial coding revealed several patterns in the data that were used for further quantitative analysis. The following discussion covers the basic findings in the LLs.

The researcher hypothesized that organizations would leverage existing informal networks via their members without prior speculation on what type of need. The focus was more on members going to their informal networks immediately when a logistical problem arose, with no real thought of what those specific problems might be, if they were related, or if tangential issues had any real bearing on whether or not informal networks were used. There was an expectation that logistics-related issues would be resolved informally more often than not, and that this would be especially evident in the chaotic environment of a disaster response.

While the LLs did show evidence of informal network usage by both AFSOC and AFSOUTH, they did not indicate bi-directional informal relationships (i.e., the initiation of an informal connection by an initiator was clearly indicated, but no clear reciprocation from the receiving party could be discerned in many cases) nor did they provide any evidence of the strength or span of those networks (beyond the initial informal connection). Not surprisingly, the LLs revealed problems that these organizations encountered while trying to support the Sustainment and Agile Combat Support components of their mission, as well as how they resolved, compensated for, or were

negatively impacted by those problems. The researcher took note of whether the solution included leveraging informal or formal networks.

The LL reports provided various other data. In the 15 LLs that were coded, 25 separate events were identified. Most of the events involved problems that needed quick resolution (reasons for submittal of the LL in the first place). Through coding, the researcher was able to identify when informal networks were used or created as part of that resolution, or if the existing formal network was relied upon. The researcher was also able to discern whether the selected network was successful in providing a resolution or, at the very least, a form of compensation.

During the second cycle of coding, the researcher discovered a pattern to the problems patterns and was able to categorize them according to those patterns. These patterns were interpreted as the 'triggers' for the initiation of the informal network, or for a hybrid of informal and formal networks. The Triggers are listed in Table 1.

Analysis of Main Components of the Coding Framework

Three main categories of the coding framework (Table 1) were combined to drive the analysis. "Triggers", "Networking" and "Taking Action" were qualitatively analyzed as an aggregated whole. Doing this allowed for eventual determination of the success or failure of the network chosen to resolve the issues in each event. The other categories in the framework, "Formal", "Informal", "Logistics", and "Organization Structure" were initially coded to allow for later analysis at the points in reports where they intersected. This turned out to be unnecessary in this case, but may prove useful in future research efforts. The description of the analysis is detailed below.

Restatement of Research Questions

An SPSS Cross-Case Analysis was used to create the necessary report requirements of a Content Analysis: Descriptive Statistic tabulations. This analysis will first be explored as it relates to the basic research questions.

1. Does use of Informal Networks resolve logistics-related issues more often than use of Formal Networks in HA/DR?
2. Are Informal Networks used more often than Formal Networks to resolve logistics-related issues in HA/DR?

In terms of the Cross-Case Analysis, the research questions can be restated as follows:

1. *Was the Network Able to Compensate [for the logistics-related issues] given a particular Network Choice?*
2. *What was the frequency of Network Choice used in response to Triggers (i.e., logistics-related issues)?*

Table 3 shows that the choice of a Formal Network led to issue resolution in 3 of the 25 events, to no resolution in 3 of the 25 events and to a partial resolution in 3 of the 25 events. The choice of an Informal Network led to issue resolution in 11 of the 25 events and no resolution in 3 of the 25 events. No partial resolutions resulted from use of an Informal Network.

When a hybrid effort was employed, use of both network choices, issue resolution occurred only once as did a partial resolution.

Table 3. Was Network Able to Compensate? * Network Choice

Crosstab

Count

		Network Choice			
		1	2	3	Total
Was Network able to compensate?	1	3	11	1	15
	2	3	3	0	6
	3	3	0	1	4
	Total	9	14	2	25

Network Able to Compensate: 1=Yes, 2=No, 3=Partially; Network Choice: 1=Formal, 2=Informal, 3=Both

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.125[a]	4	.087
Likelihood Ratio	10.015	4	.040
N of Valid Cases	25		

a. 7 cells (77.8%) have expected count less than 5. The minimum expected count is .32.

Table 4 shows us that the Formal Network was chosen most often for the trigger Lack of Own Resources (chosen 5 times). This is also true for the choice of Informal Network (chosen 8 times). The second most-frequent trigger of Formal Network use was Lack of Coordination. For Informal Network use it was Urgent Need.

Table 4. Network Choice * Trigger

Crosstab

Count

		Trigger							
		1	2	3	4	5	6	7	Total
Network Choice	1	0	2	1	1	0	5	0	9
	2	2	0	1	1	1	8	1	14
	3	1	0	0	0	0	1	0	2
	Total	3	2	2	2	1	14	1	25

Network Choice: 1=Formal, 2=Informal, 3=Both; Trigger: 1=Urgent Need, 2=Lack of Coordination, 3=Lack of Proper Planning, 4=Lack of Formal Guidance, 5=Lack of Communication, 6=Lack of Own Resources, 7=Lack of Agreement)

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.255[a]	12	.681
Likelihood Ratio	10.835	12	.543
N of Valid Cases	25		

a. 19 cells (90.5%) have expected count less than 5. The minimum expected count is .08.

A quick comment on Tables 3, 4 & 5 (presented below): these tables reflect the frequencies mentioned in this analysis. In Table 3, the Chi Square results indicate that the relationship between Network Ability to Compensate and Network Choice would occur by chance less than eight out of 100 times (Pearson's coefficient = .087). Or, that there is a 91% chance that a difference exists. However, in Table 4 the same statistic indicates that the relationship between Network Choice and Trigger would occur by chance less than six in ten times (Pearson's coefficient = .681), or only a 40% chance that a difference exists. In Table 5, it indicates that the relationship between the Network's Ability to Compensate and Trigger would occur by chance less than six in ten times (Pearson's coefficient = .621), also only 40%.

Of these, only the first Network Ability to Compensate * Network Choice, indicates a significant difference (p-level ≤ .09), meaning that a network's ability to compensate could be influenced by network choice. Unfortunately, this did not hold for all Cross-case analysis results (Appendix E). It is thought this may be due to the small number of cases analyzed (N=25).

Triggers, Network Ability to Compensate & Network Choice

The presence of 'triggers' and their connection to the success and use of informal networks was impossible to ignore in the data. The most salient were those where the organization lacked some key element and was unable to meet its aims via ordinary channels (their formal network). In some cases, these triggers meant that both formal and informal networks were used, but usually it was the informal network through which the means to compensate were found.

Table 5. Was Network Able to Compensate? * Trigger

Crosstab

Count

		Trigger							
		1	2	3	4	5	6	7	Total
Was Network able to compensate?	1	3	1	1	1	0	8	1	15
	2	0	1	0	1	1	3	0	6
	3	0	0	1	0	0	3	0	4
	Total	3	2	2	2	1	14	1	25

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.940[a]	12	.621
Likelihood Ratio	11.354	12	.499
N of Valid Cases	25		

a. 20 cells (95.2%) have expected count less than 5. The minimum expected count is .16.

V. Discussion & Conclusions

Discussion of Triggers

Urgent Need

A general sense of urgency defines all HA/DR operations and formal response efforts are designed with this in mind. However, some situations require creativity outside the formal structure, or they occur before the formal structure is fully functional. This trigger resulted in a successful use of an informal network to accelerate the movement of American citizens out of Haiti. After four or five days without adequate food or water, some citizens began to die while waiting for airlift. 1 SOW had already been moving them out according to plan, but this occurrence ramped up the sense of urgency, "we had to start moving them out more aggressively, on every available aircraft to any available location" (ID38010d). This required a hybrid of formal and informal networking; 1 SOW used formal processes and connections to initiate informal connections, allowing them to utilize previously unplanned aircraft and destinations to save lives. 1 SOW used this hybrid approach to successfully resolve the issue.

Lack of Coordination & Lack of Proper Planning

Merriam-Webster's Collegiate Dictionary online defines coordination as "1: to put in the same order or rank; 2: to bring into common action, movement or condition: HARMONIZE; 3: to be or become coordinate especially so as to act together in a smooth concerted way" (www.merriam-webster.com). In the military, we coordinate large operations through planning. For this reason, the researcher found it difficult to separate the two concepts, and acknowledges that in some instances, their coding may overlap. For this reason, they are presented together here.

ID38093 was coded as a Lack of Coordination. It involved a lack of daily TPFDD reviews by AFSOUTH A3 staff. This is a key element of flexible coordination and planning. TPFDD reviews are needed daily in order to ensure appropriate personnel, materials and equipment depart CONUS and are properly adjusted once the situation in-country becomes clear (ID 38093). The daily review was finally instituted nine days after the earthquake occurred, however the LL did not indicate what, if any, actions were taken by AFSOUTH A3 to compensate for their initial absence. There is only a recommendation to immediately develop a daily force flow meeting. Therefore, the researcher assumed that the existing Formal Network was used, but unsuccessfully.

Faulty Organizational Processing or Knowledge

In these instances, the organization's formal network is in-place and functioning, however one or more formal processes have caused a delay or degradation to the response effort. Or, the delay or degradation is the result of lapses in organizational knowledge. This reason triggered successful use of an informal network in one case, ID37834. The two other cases showed a continued reliance on the existing formal network, only one was partially successful. This was case ID37835, summarized below.

Six days after the earthquake, relief supplies finally flowed into Haiti via aerial delivery. Unfortunately, the wrong type of food was delivered. ACC aerial delivery planners assumed that Meals-Ready-to-Eat (MREs) would suffice; they did not coordinate ahead of time with the Department of State to leverage its extensive experience in this area. Had they done so, planners would have learned that a starving and dehydrated population requires Humanitarian-Daily-Rations (HDRs), which are specifically designed to their nutritional needs.

This is an example of both Faulty Organizational Processing and Faulty Organizational Knowledge. Both the basic processing (relief supply delivery planning) and knowledge (the need to deliver durable food items) existed and had been developed over the years through education and training. However, neither was employed to its fullest extent. The report ended with the simple recommendation to use HDRs in future HA/DR response efforts. However, since the disaster victims did receive food, albeit the wrong kind, it was coded as a partial success.

Lack of Formal Guidance

Formal Guidance covers both formal written and voice guidance. In military operations, written Formal Guidance is usually in the form of OPLANs, CONPLANs, ROEs, NEOs etc., but can extend to formal email channels as well. Formal voice guidance, in this context, means just that, voice communication delivered from higher level authority to direct or shape the actions of subordinate organizations. An example of voice guidance is the VOCO, or Voice Command, from U.S. Special Operations Command, for AFSOC to deploy the 1 SOW into Haiti, in the early morning following the earthquake.

A Lack of Formal Guidance triggered use of informal networks in two cases which seemed to provide a solution (ID38010c, ID37981b). A third case was also coded at this category, leveraging the formal network to successful resolution of the situation (ID38092).

Lack of Communication

Though guidance is a form of communication, the Lack of Communication category is distinct from the previous category because it was used to code cases that

demonstrated communication of an informational nature. One case, ID37625, clearly showed a lack of communication with units in CONUS when the first indication that a Remotely Piloted Vehicle (RPV) was in the Haitian operations area came from the casual arrival of the LNO into the CAOC. The associated report simply recommended better communication in future operations but not any specific actions; there was no evidence that the situation was remedied either by formal or informal network.

Lack of Own Resources

This reason was the most common trigger of informal network usage, and is self-explanatory. The lacking resources included adequate manpower, equipment, supplies, food, water, fuel and latrine facilities; resources that the organization needed for its own purposes, versus resources it might provide to others (e.g., HDRs for disaster victims). Twelve cases involved the Lack of Own Resources. In nine of those cases, it triggered the use of an informal network, and the issue was successfully resolved or compensated (ID37834, ID37645a, ID37645c, ID37645e, ID37645f, ID38010a, ID38010b, ID37999, ID37407). The existing formal network was used in the remaining cases (ID38092, ID37645b, ID37969) only one of which provided evidence of a successful resolution (ID38092).

Functional Gap in the Formal Network

It seemed that regardless of which trigger occurred, *either* network enabled the organization to find a solution to the problem, with one possible exception: Functional Gap in the Formal Network. For example:

LL ID37394, submitted by 1 SOG (AFSOC), is representative of these cases. In it, 1 SOG details that humanitarian missions which necessitate a quick response are very

likely to have limited Command and Control functions already in place when AFSOC forces arrive in the disaster-stricken area. This is a recognition that although a Joint organizational structure may be in place or in the process of forming, there exists a gap between that structure and AFSOC's structure. 1 SOG recommends that, immediately upon establishment of "our own assets", AFSOC's XP (Plans & Programs) personnel should "seek out the joint C2 structure and engage for coordination and tasking". 1 SOG extends this recommendation to the NGO structure as well.

The choice of words is telling in this case. By recommending that someone "seek out" a formal structure, 1 SOG is indicating a lack of a formal connection to that structure, a connection that should exist in order to facilitate key operational components of coordination and tasking. "Seek out" also indicates a departure from a formalized process in order to go about making the connection. This was interpreted as a recommendation to engage in informal networking. In the statement, "initially the lack of Mil C2 creates missions based on Ad Hoc tasking directly from individual agencies", we see a direct statement attesting to the existence of a gap in the formal structure (or network) in place. However, there is no record of a remedy or work-around used to compensate for this gap during the Haiti response, merely the recommendation given above.

It makes intuitive sense that if a gap in the formal structure is the problem, a departure from that structure might be necessary to compensate for it. When the trigger was the existence of a Functional Gap in the Formal Network, the outcome was, at best, only partially successful. Six such instances occurred (ID38093, ID37645d, ID37645g, ID37445, ID37394, ID37981a), all showing the use of an informal network, but only one

of these enjoyed successful issue resolution, two were partial success. The remaining cases showed evidence of reliance on the existing formal network, but no indication of any resolution or compensation, partial or otherwise. Instead, these cases resulted in a recommendation to future HA/DR response organizations to ensure those gaps are filled, and nothing further. As a result, the researcher speculates that informal networks may need the underpinnings of a formal network to be fully advantageous to its members in the resolution of logistics issues during HA/DR.

Lack of Agreement

This category was interesting because it illuminated the often disparate nature of civilian and military organizations, even when both are working towards the same honorable goals of saving lives and providing aid to a traumatized populace. Designated the lead agency in the relief effort, USAID had a dedicated, orderly plan for the arrival of relief supplies into the country and for their equitable distribution to the people of Haiti. However, in true military contingency fashion, the JTF-Haiti commander asked for supplies to come in from anywhere, "Just keep sending stuff; I'll tell you when to stop" (HQ AFSOUTH/A9L, 2010).

Unfortunately, this resulted in a rapid but ad-hoc push of forces and supplies, executed outside of formal planning, sourcing, and tracking procedures, and created bottlenecks along the way. Once supplies made it into the country, the JTF delivered them to the citizens of Haiti via the most efficient method available: helicopter airdrop. This contradicted USAID's methodical distribution plan. The effect within the organizations was "plenty of documented stories between people getting yelled at and

tensions going high" (ID38015). For the earthquake victims, the effect was rioting and violence at the airdrop points.

Though both organizations meant well, their philosophies were at loggerheads and turned a bad situation into a far worse one. To compensate, 1 SOW tended its informal relationships carefully, as described in the Use of Informal Network as part of Mission category, tying that category to this one. The researcher has kept them separate in the opinion that, had the philosophies been aligned, 1 SOW would still have carefully cultivated its informal network to the NGOs.

Networking

The networking category is self-explanatory. The subcategory codes in it do a good job of describing how coding of this category took place. Instances in the reports where each of those concepts occurred were coded as such (i.e., functional communication, evidence of formal or informal networking, information sharing, etc.) and later incorporated into the evaluation of the success of the chosen network.

Taking Action

The category "Taking Action" involved instances in the text where positive steps were taken, and clearly identified as such, to resolve the issue at hand. The first subcategory, Improvising, is self-explanatory, involving not atypical actions of producing or making something from whatever is available (www.merriam-webster.com). Like the Networking category, Improvising was later factored into the evaluation of the success of the chosen network. The second subcategory, however, requires some explanation.

Instances where Informal Network actions enabled Formal Network actions

This category is similar to Functional Gap in the Formal Network, with one important difference: the coded instances that fall under this category show that the informal network put into action was able to bridge the gap from one functional formal network to another.

The best example of this occurrence was in the unauthorized movement of AMCITs out of Haiti. 1 SOW loaded AMCITs onto as many departing aircraft as they could because they had so many of them waiting for airlift with nowhere else to go. No formal processes had yet been put in place to move these people. No airlift had been assigned and no destinations had been determined by higher authorities. The hard-charging folks of 1 SOW took matters into their own hands, making the informal connections required to put the AMCITS on "every available aircraft to any available location". They had full confidence that the formal structure back in CONUS could handle this, so they *assumed the responsibility* of initiation. As Col Elton put it, "we just started doing it and we figured the system would catch up" (ID38010d).

Use of Informal Network as Part of Mission

The magnitude of the response in Haiti was colossal and represented the most "Whole of Government"/ International response to a natural disaster seen to date (HQ AFSOC/A9L, 2010). As a result, several organizations regularly exceeded the boundaries of the formal networks that attached them to the myriad of NGOs and other federal and international relief agencies. This was done as a way of accomplishing the mission versus resolving an issue. It is well known in HA/DR circles that these civilian

organizations eschew the military C2 structure (HQ AFSOC/A9L, 2010). Presumably to facilitate cooperation and meet their mission objectives, 1 SOW sought out informal connections and leveraged their informal networks to these other organizations.

For example, in ID38015, 1 SOW maintained strong relationships with USAID, the UN, and the World Food Program through Liaison Officers (LNO), a use of the formal network. But they also went outside that network, in some cases obviating the need for such a formal network connector. The JSOAC commander, Colonel Elton describes going "outside" the established structure as a way of nurturing the relationships his organization needed to accomplish their mission:

> "We didn't necessarily need an LNO for USAID because we had daily contact with them through officers at the airfield. But, we did have good communication and daily contact with the World Food Program. It was outside of the…JTF J-9 Non-Governmental Organization (NGO) coordination cell that they had and I think we had a good perspective due to our personal relationships between some of those organizations".

Though it was originally coded and categorized as a trigger, the researcher decided not to include Use of Informal Network as part of Mission in the Cross-Case analysis because it occurred as part of normal operations and not specifically in order to resolve an issue. Therefore, it did not 'trigger' Informal Network use the way other triggers did.

Conclusions

First and foremost, were the research questions answered? Qualitatively, yes. For more detail, the research question themselves will guide the discussion.

1. Does use of Informal Networks resolve logistics-related issues more often than use of Formal Networks in HA/DR?

The qualitative analysis, as tabulated in the Appendix D, suggests that it does. Cross-case analysis in Table 3 showed that in the 25 events analyzed, successful issue resolution was achieved by an Informal Network more often than by a Formal Network (11 times vs. 3 times). Informal Network use did not result in any partial issue resolutions, but partial resolution was achieved three times by a Formal Network. The Chi Square test only indicated significance for Network Ability to Compensate * Network Choice, (p-level $\leq .09$) but not elsewhere. This disparity could render those other results inconclusive. However, at a Pearson's coefficient of .087, there is a good possibility that a network's ability to compensate is influenced by network choice. This indicates that the higher number of successful issue resolutions was a result of using an Informal Network.

2. Are Informal Networks used more often than Formal Networks to resolve logistics-related issues in HA/DR?

Again, the qualitative analysis suggests this is true (Appendix D) as do the numbers in the cross-case analysis. Both Tables 3 and 4 show that Informal Networks were used more often than Formal Networks (14 times vs. 9 times). And a hybrid of both networks was used twice, including one of the instances of partial issue resolution mentioned previously. As with the previous assessment, the Chi Square test showed non-significance meaning these results could also be inconclusive.

The most interesting insight in this study came from the analysis of the trigger Functional Gap in the Formal Network. The researcher suspects that when such a gap exists, the Informal Network is ill-equipped to fully counteract it in order to resolve logistics-related issues in HA/DR. The Informal Network seems to rely upon the

existence of a Formal Network that, despite its flaws, is still functional. However, this could be viewed another way.

Lesson Learned reports are typically submitted when a problem exists. More specifically, Lesson Learned reports are submitted when a problems exists with the normalized way and structure of doing things, the Formal Network. If no problem exists, then no reason exists to submit a report. This indicates the possibility that the outcomes in this study could be biased simply because of the medium. The Lesson Learned reports themselves could present a negative bias merely by existing. An entirely separate study is needed to make that determination.

Overall, the qualitative analysis suggests that, for logistics-related issues in HA/DR, Informal Networks provided successful resolution more often than Formal Networks and they were used more often than Formal Networks. In the quantitative analysis, only the relation of Network Ability to Compensate to Network Choice shows promise with a 92% chance that Network Ability to Compensate is influenced by Network Choice.

Limitations & Assumptions

Limitations

Self-Report Bias

Using reports (i.e., Lessons Learned) as data sources has the key limitation of relying on self-report data. The researcher assumed the respondents represented their efforts and the situation objectively and were not tempted to cast themselves in a favorable light (Podsakoff & Organ, 1986).

The AARs and CDRs were used as a foundation for later analysis of the LLs. The CDRs were instrumental in providing the backdrop, story and timelines for how Air

Force forces flowed into the theater of operations, as well as perspective into how handoff of responsibilities occurred and how decisions were made. Chapter 2 of this project related relevant points of HQ AFSOC/A9L's and AFSOUTH's AAR, and CDR; a timeline is included in Appendix A. Informative as they were, these documents were also susceptible to the possible self-report bias of their authors.

Scope

To provide the appropriate scope for this level of research, the analysis was limited to content present in the case of the U.S. Air Force disaster response efforts to the Haiti Earthquake of January 2010, as reported through the lessons learned submitted by the participants. The participants of interest in this case were the forces of AFSOC and AFSOUTH whose arrival into Haiti overlapped; the forces of AFSOC arrived first to secure the airfield and establish a Joint Air Operations Center (JAOC), and the forces of AFSOUTH arrived later to take over airfield and security responsibilities as well as general air forces coordination.

Limiting the scope in this way could present a potential selection bias threat to internal validity. However, such limitation was thought necessary due to time and access available to conduct the study.

Generalizability

To enhance generalizability of findings, the researcher would have to repeat this study across different humanitarian or disaster events (e.g., the Japanese Earthquake and Tsunami of March 2011). The researcher could compare the data from this event to HA/DR exercises. The researcher could also extend the study to all of the participating

HA/DR organizations involved, both in the local affected area and in 'reach-back' support locations away from the disaster.

Assumptions

The key assumption made in this study was one of representation. It was assumed that the organizations of AFSOC and AFSOUTH are representative of similar organizations with similar missions, force structure, training, support and relationships. Two key differences in these organizations may impact how they operate: 1) their sizes and 2) their cultures. It is reasonable to assume that because AFSOUTH is the larger organization it would have many more established relationships, a wider span of influence and network of resources, than the much smaller AFSOC. However, their different cultures present an interesting twist.

AFSOC's culture, in line with the overarching USSOCOM culture, is one of self-reliance, flexibility and dogged pursuit of objectives despite all obstacles. Like the proverbial "snake-eater" of special operations lore, the AFSOC mentality is one of making due and not accepting defeat. This requires a large dose of creativity since they often find themselves short of resources, as well as a strong willingness to flex from the established way of doing things. Special Operations in general, is a small, mobile community that prides itself on being able to do more with less. AFSOUTH, being more entrenched, as it were, in its formal connections and command relationships, can be seen as less tractable but better able to leverage more resources. It's possible these differences could have some effect on their approaches to problem resolution.

Finally, as alluded to in the previous section, this study assumed that the medium of Lessons Learned reports did not negatively bias the interpretation, coding, categorizing or results of the study.

Implications

Possible future implications of this research include arming leaders and crisis response managers with the information to better exploit their informal networks and to help subordinates build and strengthen *their* informal networks.

Specific to HA/DR logistics, this study could increase awareness of recurring categories of logistics-related issues and how they are resolved. As in, the knowledge that informal networks are the network of choice for a particular issue/trigger can signal response units to prepare and/or nurture their informal connections prior to deploying to the disaster area.

Today's HA/DR situations are multi-agency, multi-organization and international by default. It is difficult to imagine a formal network that could successfully bridge all of the differences in missions, perspectives and cultures involved. Studies like this one help reinforce the point that "soft skills", like leveraging informal networks, are valuable to mission success, and deserve more than just lip-service in the training arena.

Recommendations for Future Research

Further analysis of informal networks will hopefully lead to more precise methods by which leaders can improve their own informal networks' ability to create and share knowledge amid the chaos of a crisis response operation.

Government emergency management in general could benefit from informal network studies by becoming more sensitized to the importance of informal personal and organizational networks in disaster response efforts. Expanding the study to inter-organizational networks may also allow planners to improve their speed, coordination and breadth of coverage when preparing their response actions. (Varda, Forgette, Banks & Contractor, 2009).

Finally, one can imagine a Joint Task Force or Contingency Response Wing deploying to a crisis situation with an accurate informal network map of the knowledge, expertise and external resource links, of their personnel. If properly developed and utilized, such a tool would be more functional and readily accessible than a simple organization chart or POC list.

APPENDIX A. AFSOUTH TIMELINE OF EVENTS

- D+0 (12 Jan 10): 2353Z a 7.0 earthquake hits Haiti, 12AF/AFSOUTH Air and Space Operations Center (612 AOC) monitored event, coordinated with SOUTHCOM and other components, initiated coordination with AFSOC, AFTRANS, Headquarters USAF and ACC; initiated personnel accountability.

- D+1: COMAFFOR Battle staff established, conducts crisis action planning; SOCSOUTH's JSOACC (1 SOW) deployed 78 Airmen and equipment via Q200 and MC-130 to Port-au-Prince (PaP) airport to re-establish airfield security, communications, air traffic control and cargo capability; 18AF/AFTRANS alerts 817 CRG for deployment.

- D+2: SOUTHCOM establishes JTF-Haiti with a JOA defined essentially as the territory, maritime and air domain within the Haiti Flight Information Region. 817 CRG Airmen arrive PaP under JTF-Port Opening to provide additional airfield security, aerial port cargo handling and airfield management. AFSOUTH provides SOUTHCOM and JTF-Haiti recommendations on ISR, Inter- and Intra-theater mobility, airspace control, additional Air Force capabilities, command arrangements, etc.

- D+3: At the request of the Government of Haiti and in coordination with ICAO, neighboring States, FAA and 1AF/AFNORTH, the Haiti Flight Operations Coordination Center (HFOCC) is established to control aircraft arrivals and ground time at PaP airport. The HFOCC operates under the 601 AOC's Regional Air Movement Coordination Center, a capability not resident in the 612 AOC. AFSOUTH proposes ISR, air mobility/APOD/aerial delivery and sustainment capabilities to JTF-Haiti. Begin evacuating AMCITs via DoD airlift.

- D+4: AFSOUTH recommends capabilities & command arrangements of AEG component to JTF-Haiti as backfill for JTF-PO and JSOACC, and expeditionary reconnaissance squadrons under separate AEG. Some 120 fixed-wing aircraft landed PaP airport, a six-fold increase from pre-quake average. Establish –cooperative airspace coordination order within & among DoD users within Haiti's sovereign airspace.

- D+6: Execute first aerial delivery of relief supplies (~14,000 MREs and 14,000 liters of water). AFSOUTH AEG ADVON team arrives PaP. AFTRANS begins airlift of 2/82 BCT, initial estimate of 75 C-17 equivalents. Assess and begin to open additional APODs in DOMREP. Begin coordination with FAA for ―Emergency Certificate of Authorization‖ to operate Remotely Piloted Aircraft from Puerto Rico. Additional coordination with DOMREP and Haiti aviation authorities for RPA overflight. Full Motion Video ISR requirement to be met via patchwork of P-3, RC-26, RQ-1 and other capabilities. Additional ISR requirements met via RQ-4 and OC-135.

- D+7: APOD at San Isidro, DOMREP opens.

- D+9: APOD at Maria Montez, DOMREP opens.

- D+10: SOUTHCOM authorizes establishment of 24AEG, Six RQ-1 aircraft and support personnel deploy to Puerto Rico. Deliver mobile FAA air traffic control tower via charter airlift to PaP. 2/82 airlift closes with 91 X C-17 loads.

- D+11: AFSOUTH ACCE forward deploys to JTF-Haiti.

- D+12: FAA tower operational, RC-26 missions begin.

- D+15: Flew first RQ-1 missions; successful FMV provided, unclassified, to JTF-Haiti, Gov‘t of Haiti and NGO authorities.

- D+23: JSOACC retrograded, CRG beginning to retrograde. HFOCC USG planning moves from 601 AOC to the 612 AOC.

- D+26: U2 missions begin.

- D+27: 24 AEG reaches IOC (flow delayed to enable closure of 2/82 BCT).

- D+28: Haitian controllers begin working in the ATC tower.

- D+29: Maria Montez (Barahona) closed for USAF ops. Transition to 1 DOMREP APOD.

- D+35: All HFOCC planning begins at 612 AOC.

- D+38: Commercial air traffic resumes service to Haiti PaP.

- D+40: 24 AEG assumes APOD responsibility from JTF-PO. JTF-PO redeploys in 38 days (45-60 day normal timeframe).

- D+41: HFOCC transition from 601 AOC to 612 AOC complete.

- D+44: 24 AEG repaired MTPP lighting outage with Haitian personnel.

- D+47: 1XRC-26 departs. San Isidro APOD closed.

- D+50: MTPP returns to pre-earthquake hours (1100 – 0300Z).

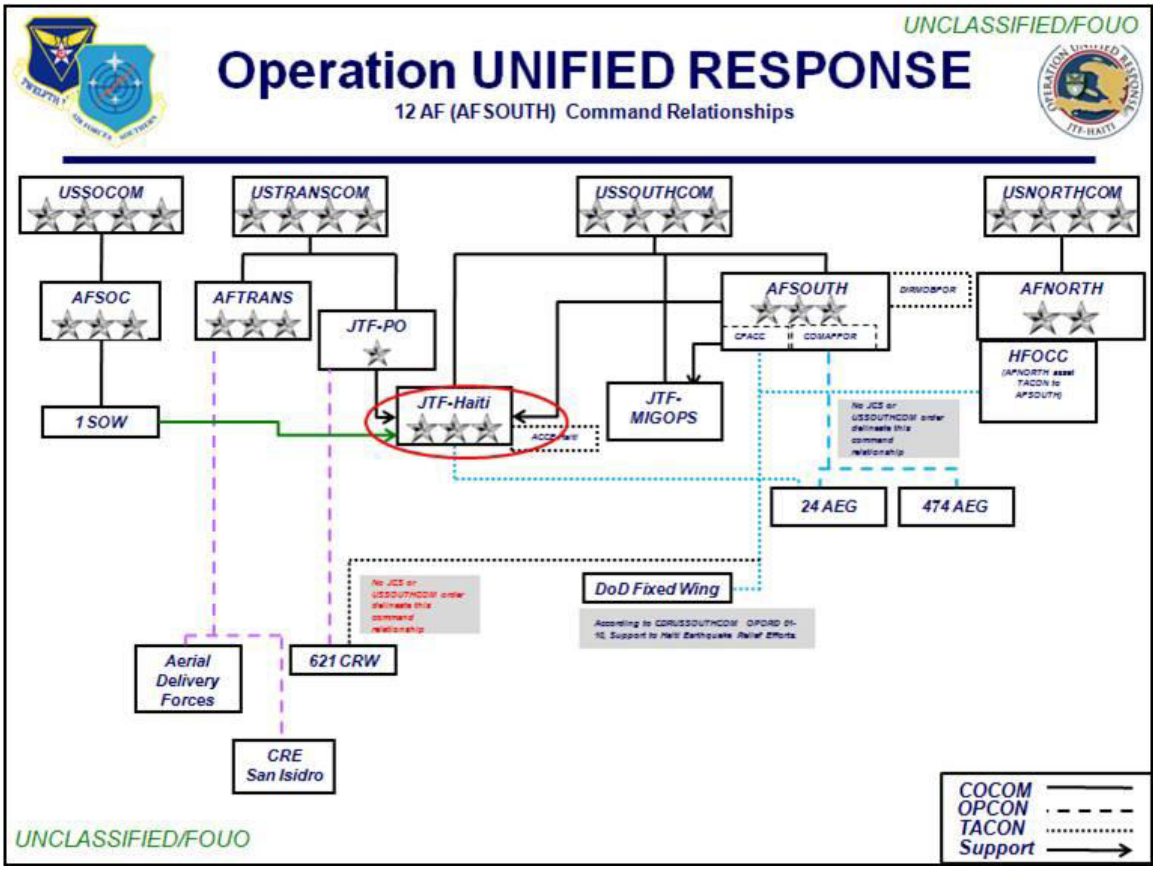
- D+52: RQ-1 redeploys.

- D+55: First significant AEG redeployment (174 pax).

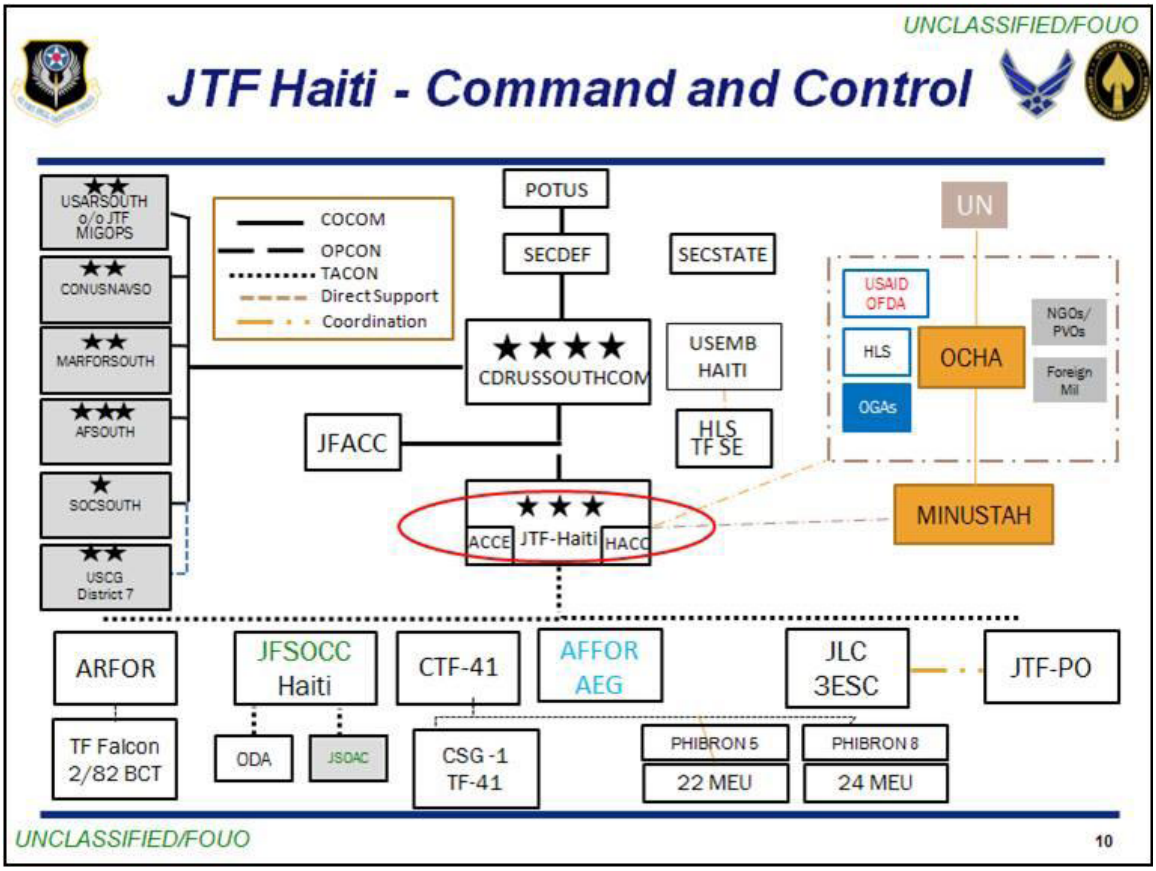
- D+62: ATC ops under full Haitian control.

APPENDIX B. FORMAL ORGANIZATION CHARTS

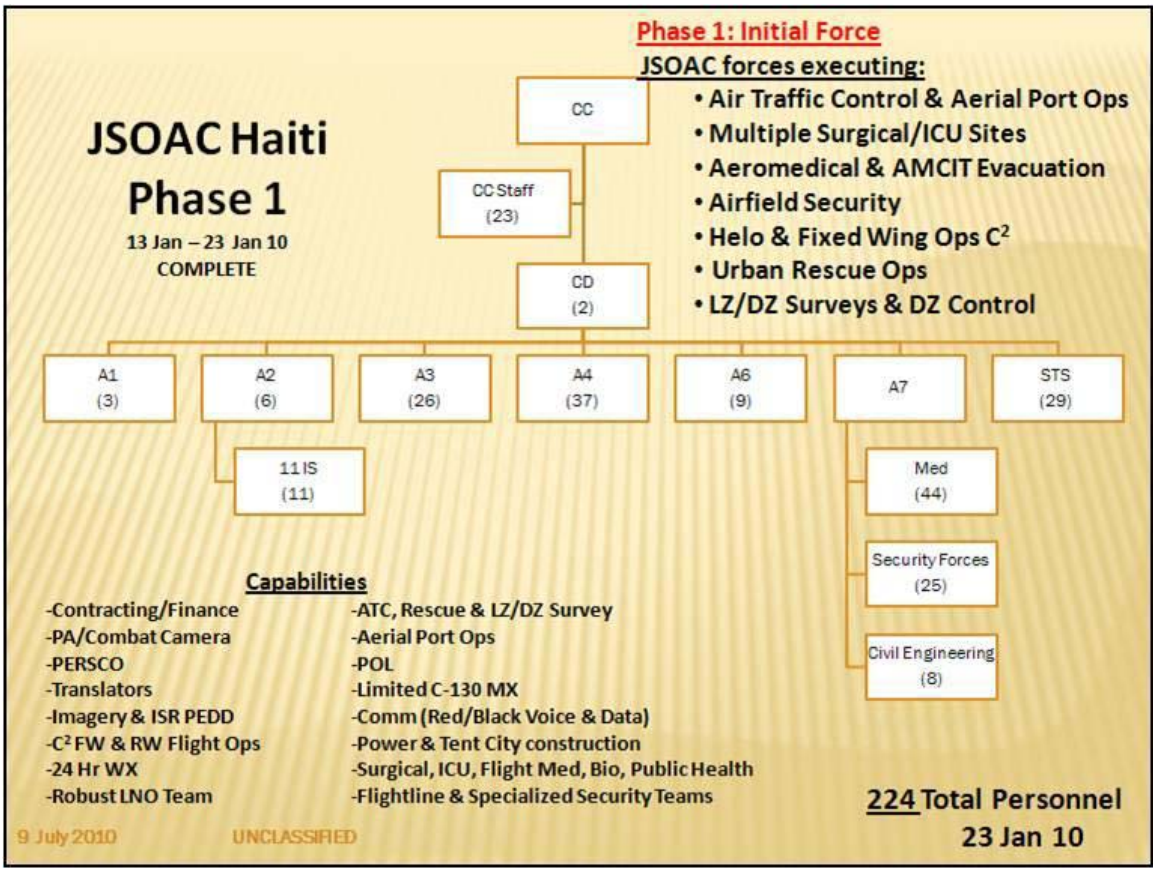
Formal Organizational Network--OUR 12 AF (AFSOUTH) Command Relationships



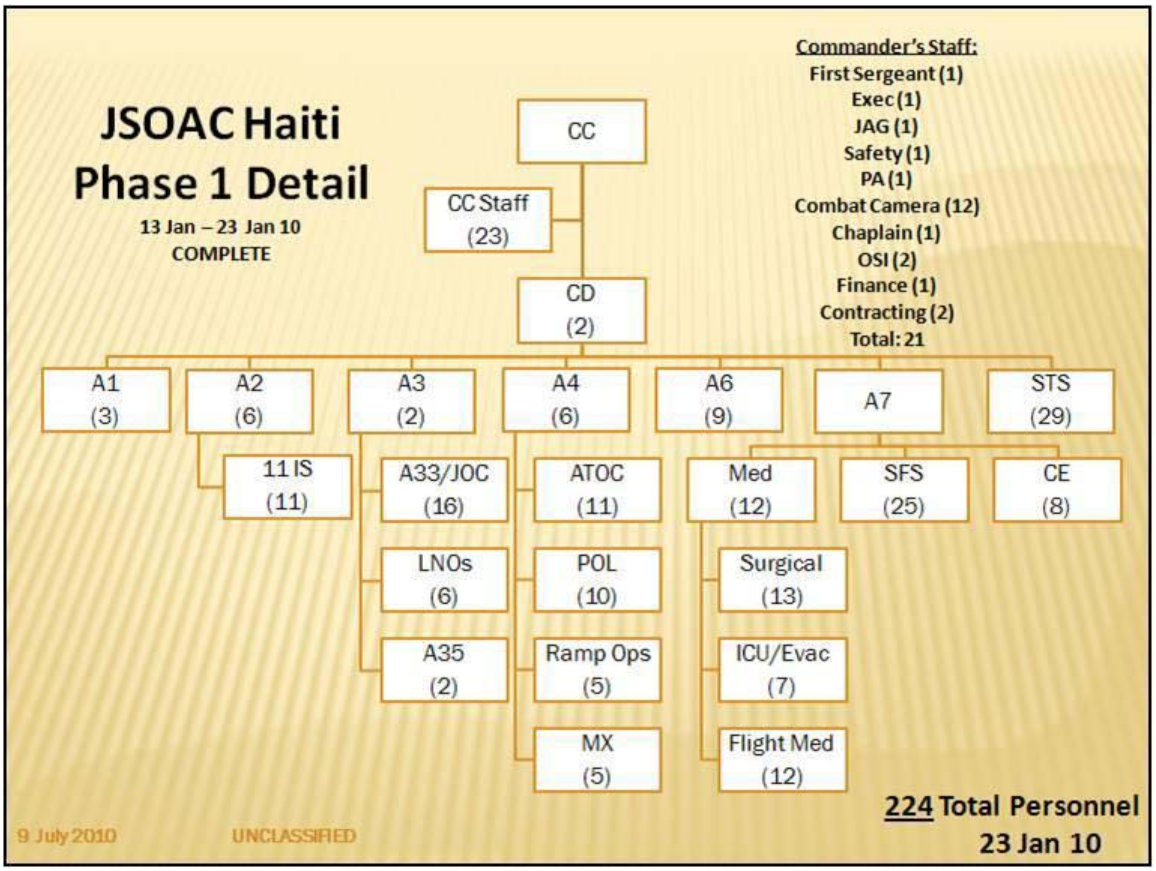
Formal Organizational Network—JTF-Haiti Command & Control



Formal Organizational Network-- JSOAC-H Phase 1 Task Organization



Formal Organizational Network-- JSOAC-H Phase 1 Detailed Task Organization



APPENDIX C. INTERCODER AGREEMENT

Coders vs Researcher, Report ID 38010

Code	Source	Kappa	Agreement (%)	Disagreement (%)
Assumed Responsibility	ID38010	0	99.29	0.71
Assumption of Follow-on Action	ID38010	0	99.71	0.29
Collaboration	ID38010	0	94.84	5.16
Communication	ID38010	0	98.15	1.85
Conflict of Interest	ID38010	1	100	0
Constrained or Limited Resources	ID38010	1	100	0
Contrary to Plan	ID38010	0	99.9	0.1
Cooperation	ID38010	0	99.28	0.72
Coordination	ID38010	0	88.06	11.94
Formal Network	ID38010	-0.0342	92.12	7.88
Formal Organization Structure	ID38010	-0.0266	84.76	15.24
Improvisation	ID38010	0	91.59	8.41
Inadequate Supply	ID38010	0	99.28	0.72
Increased Demand	ID38010	0	99.32	0.68
Informal acts enable Formal acts	ID38010	0	94.77	5.23
Informal Network	ID38010	0.3186	91.85	8.15
Informal Organization Structure	ID38010	1	100	0
Information Sharing	ID38010	0	98.81	1.19
Knowledge Sharing	ID38010	1	100	0
Lack of Collaboration	ID38010	1	100	0
Lack of Coordination	ID38010	0	94.53	5.47
Lack of Formal Networks	ID38010	1	100	0
Lack of Formal Plan	ID38010	0	99.42	0.58
Lack of Proper Equipment	ID38010	0	99.15	0.85
Lack of Resources	ID38010	1	100	0
Late to Need	ID38010	0	99.64	0.36
Not Enough People	ID38010	0	99.5	0.5
Self-Sustainment	ID38010	0	99.68	0.32
Time Sensitivity	ID38010	0	98.83	1.17
Urgent Need	ID38010	0	99.58	0.42

Coders vs Researcher, Report ID 37394

Code	Source	Kappa	Agreement (%)	Disagreement (%)
Assumed Responsibility	ID37394	1	100	0
Assumption of Follow-on Action	ID37394	1	100	0
Collaboration	ID37394	0	98.66	1.34
Communication	ID37394	1	100	0
Conflict of Interest	ID37394	1	100	0
Constrained or Limited Resources	ID37394	0	99.48	0.52
Contrary to Plan	ID37394	1	100	0
Cooperation	ID37394	1	100	0
Coordination	ID37394	0.333	96.48	3.52
Formal Network	ID37394	-0.0688	86.54	13.46
Formal Organization Structure	ID37394	0.1678	89.08	10.92
Improvisation	ID37394	1	100	0
Inadequate Supply	ID37394	1	100	0
Increased Demand	ID37394	1	100	0
Informal acts enable Formal acts	ID37394	0	91.52	8.48
Informal Network	ID37394	0.2838	96.69	3.31
Informal Organization Structure	ID37394	1	100	0
Information Sharing	ID37394	0	95.09	4.91
Knowledge Sharing	ID37394	0	99.29	0.71
Lack of Collaboration	ID37394	1	100	0
Lack of Coordination	ID37394	0	97.9	2.1
Lack of Formal Networks	ID37394	0	98.85	1.15
Lack of Formal Plan	ID37394	1	100	0
Lack of Proper Equipment	ID37394	1	100	0
Lack of Resources	ID37394	1	100	0
Late to Need	ID37394	1	100	0
Not Enough People	ID37394	1	100	0
Self-Sustainment	ID37394	1	100	0
Time Sensitivity	ID37394	0	99.19	0.81
Urgent Need	ID37394	1	100	0

Coders vs Researcher, Report ID 38015

Code	Source	Kappa	Agreement (%)	Disagreement (%)
Assumed Responsibility	ID38015	1	100	0
Assumption of Follow-on Action	ID38015	1	100	0
Collaboration	ID38015	0	95.25	4.75
Communication	ID38015	1	100	0
Conflict of Interest	ID38015	0	99.15	0.85
Constrained or Limited Resources	ID38015	1	100	0
Contrary to Plan	ID38015	1	100	0
Cooperation	ID38015	0	99.27	0.73
Coordination	ID38015	0.2446	97.57	2.43
Formal Network	ID38015	0.1113	91.41	8.59
Formal Organization Structure	ID38015	0.1603	93.25	6.75
Improvisation	ID38015	1	100	0
Inadequate Supply	ID38015	1	100	0
Increased Demand	ID38015	1	100	0
Informal acts enable Formal acts	ID38015	1	100	0
Informal Network	ID38015	0.2315	96.96	3.04
Informal Organization Structure	ID38015	0	99.18	0.82
Information Sharing	ID38015	0	97.32	2.68
Knowledge Sharing	ID38015	1	100	0
Lack of Collaboration	ID38015	0	98.59	1.41
Lack of Coordination	ID38015	0	99.27	0.73
Lack of Formal Networks	ID38015	1	100	0
Lack of Formal Plan	ID38015	1	100	0
Lack of Proper Equipment	ID38015	1	100	0
Lack of Resources	ID38015	0	99.64	0.36
Late to Need	ID38015	1	100	0
Not Enough People	ID38015	1	100	0
Self-Sustainment	ID38015	1	100	0
Time Sensitivity	ID38015	1	100	0
Urgent Need	ID38015	1	100	0

APPENDIX D. OCCURRENCE OF TRIGGER CATEGORIES PER EVENT

Events	Org	MAJCOM	Location	Network Choice 1=Formal, 2=Informal, 3=Both	Was Network able to compensate? 1=Yes, 2=No, 3=Partially	Trigger 1=Urgent Need 2=Lack of Coord 3=Lack of Planning 4=Lack of Formal Guidance 5=Lack of Comm 6=Lack of Own Resources 7=Lack of Agreement	Urgent Need	Lack of Coordi nation	Faulty Org Processes	Lack of Proper Planning	Faulty Org Knowledge	Lack of Formal Guidance	Lack of Commun ication	Lack of Own Resource	Functional Gap in Formal Network	Lack of Agree ment
Coding	text	1,2	text	1,2,3	1,2,3	1-7	1	1	1	1	1	1	1	1	1	1
ID37834	ACC-A7E	1	UNK	2	1	3					1			1		
ID37835	ACC	1	UNK	1	3	3					1					
ID37896	AFSOUTH	1	UNK	1	2	6								1		
ID38092	AFSO_A3	1	CONUS	1	1	2			1	1		1		1		
ID38093	AFSO_A3	1	CONUS	1	2	2		1		1					1	
ID37645a	EMEDS	1	Haiti	2	1	6								1		
ID37645b	EMEDS	1	Haiti	1	3	6								1		
ID37645c	EMEDS	1	Haiti	2	1	6								1		
ID37645d	EMEDS	1	Haiti	1	3	6									1	
ID37645e	EMEDS	1	Haiti	2	1	6				1				1		
ID37645f	EMEDS	1	Haiti	2	1	6								1		
ID37645g	EMEDS	1	Haiti	2	1	6									1	
ID37445	AFSOUTH	1	Haiti	2	2	6									1	
ID37625	AFSOUTH	1	Haiti	2	2	5							1			
ID37394	1SOG	2	Haiti	2	2	6									1	
ID38015	1SOW	2	Haiti	2	1	7										1
ID38010a	1SOW	2	Haiti	2	1	1	1									
ID38010b	1SOW	2	Haiti	3	1	1										
ID38010c	1SOW	2	Haiti	2	1	4						1		1		
ID38010d	1SOW	2	Haiti	2	1	1	1							1		
ID37999	1SOW	2	Haiti	1	1	6								1		
ID37981a	1SOW	2	Haiti	3	3	6								1	1	
ID37981b	1SOW	2	Haiti	1	2	4						1				
ID37969	1SOW	2	Haiti	1	1	6								1		
ID37407	1SOG	2	Haiti	2	1	6								1		

APPENDIX E. ADDITIONAL CROSS-TAB ANALYSIS

Cross-case Analysis of Chosen Network's Ability to Compensate

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Was Network able to compensate? * Network Choice	25	100.0%	0	.0%	25	100.0%
Was Network able to compensate? * Trigger	25	100.0%	0	.0%	25	100.0%
Was Network able to compensate? * MAJCOM	25	100.0%	0	.0%	25	100.0%

Was Network able to compensate? * Network Choice

Crosstab

Count

		Network Choice			
		1	2	3	Total
Was Network able to compensate?	1	3	11	1	15
	2	3	3	0	6
	3	3	0	1	4
	Total	9	14	2	25

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.125[a]	4	.087
Likelihood Ratio	10.015	4	.040
N of Valid Cases	25		

a. 7 cells (77.8%) have expected count less than 5. The minimum expected count is .32.

Was Network able to compensate? * Trigger

Crosstab

Count

		Trigger							
		1	2	3	4	5	6	7	Total
Was Network able to compensate?	1	3	1	1	1	0	8	1	15
	2	0	1	0	1	1	3	0	6
	3	0	0	1	0	0	3	0	4
	Total	3	2	2	2	1	14	1	25

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.940[a]	12	.621
Likelihood Ratio	11.354	12	.499
N of Valid Cases	25		

a. 20 cells (95.2%) have expected count less than 5. The minimum expected count is .16.

Was Network able to compensate? * MAJCOM

Crosstab

Count

		MAJCOM		
		1	2	Total
Was Network able to compensate?	1	7	8	15
	2	4	2	6
	3	3	1	4
	Total	14	11	25

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.393[a]	2	.498
Likelihood Ratio	1.432	2	.489
N of Valid Cases	25		

a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is 1.76.

Cross-case Analysis of Network Choice

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Network Choice * Trigger	25	100.0%	0	.0%	25	100.0%
Network Choice * MAJCOM	25	100.0%	0	.0%	25	100.0%

Network Choice * Trigger

Crosstab

Count

		Trigger							
		1	2	3	4	5	6	7	Total
Network Choice	1	0	2	1	1	0	5	0	9
	2	2	0	1	1	1	8	1	14
	3	1	0	0	0	0	1	0	2
	Total	3	2	2	2	1	14	1	25

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.255[a]	12	.681
Likelihood Ratio	10.835	12	.543
N of Valid Cases	25		

a. 19 cells (90.5%) have expected count less than 5. The minimum expected count is .08.

Network Choice * MAJCOM

Crosstab

Count

		MAJCOM		
		1	2	Total
Network Choice	1	6	3	9
	2	8	6	14
	3	0	2	2
	Total	14	11	25

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.968[a]	2	.227
Likelihood Ratio	3.718	2	.156
N of Valid Cases	25		

a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is .88.

Bibliography

American Psychological Association. (2010). *Publication Manual of the American Psychological Association*. (6th ed.) Washington, DC: Author.

Bazeley, P. (2007). *Qualitative Data Analysis with NVivo*. (2nd ed.). Thousand Oaks, CA: Sage.

Bharosa, N., Lee, J., & Janssen, M. (2010). Challenges and Obstacles in Sharing and Coordinating Information During Multi-agency Disaster Response: Propositions from Field Exercises. *Information Systems Frontier. 12*, 49-65. doi: 10.1007/s10796-009-9174-z.

Berg, B. (2007). *Qualitative Research Methods for the Social Sciences*. (6th ed.). Boston, MA: Pearson Education Inc.

Charmaz, K. (2006). *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*. Thousand Oaks, CA: Sage.

Corbin, J., & Strauss, A. (2008). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (3rd ed.). Thousand Oaks, CA: Sage.

Cross, R., Parker, A., Prusak, L., & Borgatti, S. (2001). Knowing What We Know: Supporting Knowledge Creation and Sharing in Social Networks. *Organizational Dynamics. 30*(2). 100-120.

Constant, D., Sproull, L., & Kiesler, S. (1996). The Kindness of Strangers: The Usefulness of Electronic Weak Ties for Technical Advice. *Organization Science, 7*(2), pp. 119-135. Retrieved from http://www.jstor.org/stable/2634976.

Davis, L. (2010). *An Examination of Network Effectiveness during Hurricane Katrina*.

Paper submitted to the CCG Doctoral Conference, University of Southern California. Los Angeles, CA.

Garnett, J., & Kouzmin, A. (2007). Communicating throughout Katrina: Competing and Complementary Conceptual Lenses on Crisis Communication. *Public Administration Review*. 67, 171.

Granovetter, M.S. (1973). The Strength of Weak Ties, *American Journal of Sociology, Vol. 78, Issue 6, May.*

HQ AFSOC/A9L (Headquarters Air Force Special Operations Command Analysis, Assessments, & Lessons Learned). (2010). *Lessons Learned from Air Force Special Operations Forces Support To: Operation Unified Response*. Retrieved from https://www.jllis.mil/jscc/index.cfm?menudisp=menu.cfm&st1clear=true

HQ AFSOUTH/A9L (Headquarters Air Forces Southern Analysis, Assessments, & Lessons Learned). (2010*). Operation Unified Response After Action Report*. Retrieved from https://www.jllis.mil/jscc/index.cfm?menudisp=menu.cfm&st1clear=true

Knost, B. R. (2006). Formal and Informal Work Group Relationships with Performance: A Moderation Model Using Social Network Analysis. *Air Force Institute of Technology*.

Krippendorf, K. (2004). *Content Analysis: An Introduction to its Methodology*. Thousand Oaks, CA: Sage.

Lin, N. (2001). *Social Capital: A Theory of Social Structure and Action*. New York: Cambridge University Press.

Lincoln, J.R., & Miller, J. (1979). Work and Friendship Ties in Organizations: A

Comparative Analysis of Relational Networks. *Administrative Science Quarterly, 24*: 181-199.

Lofland, J., Snow, D., Anderson, L., & Lofland, L. (2006). *Analyzing Social Settings: A Guide to Qualitative Observations and Analysis*. (4th ed.). Belmont, CA: Thomson-Wadsworth.

Lombard, M., Snyder-Duch, J. & Bracken, C.C. (2010). *Practical Resources for Assessing and Reporting Intercoder Reliability in Content Analysis Research Projects*. Retrieved from http://astro.temple.edu/~lombard/reliability/.

Merriam Webster Dictionary Online. www.merrriam-webster.com.

Miles, M.B., & Huberman, A.M. (1994). *Qualitative Data Analysis*. (2nd ed.). Thousand Oaks, CA: Sage.

Nahapiet, J., & Ghoshal, S. (1998). Social Capital, Intellectual Capital, and the Organizational Advantage. *The Academy of Management Review, 23*(2), 242. Retrieved from http://proquest.umi.com/pqdweb?did=29206572&Fmt=7&clientId=27547&RQT=309&VName=PQD.

Neuendorf, K (2002). *The Content Analysis Guidebook*. Thousand Oaks, CA: Sage

Nirmala, M., & Vemuri, M. (2009). Leveraging Informal Networks in Knowledge Management. *Journal of Knowledge Management.13*(3), 146-156. doi: 10.1108/13673270910962932.

Podsakoff, P.M., & Organ, D.W. (1986). Self-Reports in Organizational Research: Problems and Prospects. *Journal of Management.12*(4), 531-544.

Putnam, R. D. (1995). Tuning In, Tuning Out: The Strange Disappearance of Social

Capital in America. *PS: Political Science and Politics, 28*(4), pp. 664-683. Retrieved from http://www.jstor.org/stable/420517.

Saldaña, J. (2009). *The Coding Manual for Qualitative Researchers*. Thousand Oaks, CA: Sage.

Scott, J. (1991). *Social Network Analysis: A Handbook*. London; Newbury Park, Calif.: SAGE Publications.

Varda, D. M., Forgette, R., Banks, D., & Contractor, N. (2009). Social network methodology in the study of disasters: Issues and Insights Prompted By Post-Katrina Research. *Population Research and Policy Review, 28* (1, Hurricane Katrina/Disaster Demography), pp. 11-29. Retrieved from http://www.jstor.org/stable/20616611.

Von Stamm, B. (2005). Exploiting the KM-Innovation Connection. *Knowledge Management Review.8*(4), 28-31.

Wasko, M. & Faraj, S. (2005). Why should I share? Examining Social Capital and Knowledge Contribution in Electronic Networks of Practice. *MIS Quarterly: Management Information Systems, 29*(1), 35-57.

Weber, R.P. (1990). *Basic Content Analysis*. (2nd ed.). Newbury Park, CA: Sage.

Yin, R.K. (2009). *Case Study Research: Design and Methods*. (4th ed.). Thousand Oaks, CA: Sage.

Vita

Major Yira Y. Muse graduated from Balboa High School in Panama City, Panama. She then attended the United States Air Force Academy in Colorado Springs, CO where she graduated with a Bachelor of Science degree in Behavioral Science and was commissioned in 1997. Upon commissioning, Major Muse attended Undergraduate Space and Missile Training at Vandenburg AFB, California. She was subsequently assigned to the 12th Missile Squadron at Malmstrom AFB, Montana where she served as a Missile Combat Crew Commander. She was then assigned to the 3rd Space Launch Squadron at Cape Canaveral AFS, Florida the Booster Operations Controller for the Titan IVB-35 launch of a Milstar satellite. Major Muse then went overseas to RAF Mildenhall as an Exercise Planner for Headquarters Third Air Force, and followed the headquarters as a Command Briefer when it moved to Ramstein AB, Germany. She then returned to the United States and was assigned to the J7 Directorate of U.S. Special Operations Command at MacDill AFB, Florida as Training Requirements Developer. Upon graduation, Major Muse will be assigned to the Space Support Branch of the Space Operations Division at Headquarters Air Force, in the Pentagon, District of Columbia.

Blue Dart

The social dynamics of informal networks are not well understood in the context of Humanitarian Assistance/Disaster Response (HA/DR). During the 2010 Logistics Officers Association National Conference, U.S. Southern Command commander, Gen Douglas Fraser, commented that, "though we have all these processes in place, it seems like its still always some chief that works the deal in the back to get the stuff we need". He was referring to the use of informal networks, in place of formal networks ("processes"), to accomplish the mission. These informal networks are what personnel typically fall back upon when formal organizational barriers constrain their ability to accomplish the mission. The question remains whether leveraging these networks is actually more successful than following established formal processes.

A Content Analysis was performed of the logistics-related Lessons Learned (LLs) submitted by the major U.S. Air Force forces that performed HA/DR actions for the Haiti Earthquake of 2010. This HA/DR was a joint, multi-national, interagency and whole of government effort orchestrated by the Joint Task Force-Haiti (JTF-H), under the auspices of the U.S. Southern Command (USSOUTHCOM). The focus of this research is on the use of informal networks to resolve logistics-related issues by Air Forces Special Operations Command (AFSOC) and Air Forces Southern (AFSOUTH). The purpose of this research is to determine if there exist any patterns in the LLs that identify situations where it is more beneficial to leverage informal networks than to rely on the existing formal networks, and to provide insight into the informal networks present throughout disaster response organizations.

The results suggest that Informal Networks provided successful resolution of issues more often than Formal Networks and they were also used more often than Formal Networks. The results also suggest that, more than any other reason, Lack of Own Resources, triggers the use of Informal Networks to resolve logistics-related issues in HA/DR.

Hopefully, such insight will enable Air Force leaders to improve their organizational communication during disaster response by properly leveraging their units' Informal Networks.

Quad Chart

Use of Informal Networks to Resolve Logistics-related Issues in Humanitarian Assistance/Disaster Response (HA/DR)

Major Yira Y. Muse
Department of Operational Sciences (ENS)
Air Force Institute of Technology

ADVISOR
Lt Col Sharon G. Heilmann

INTRODUCTION:

- Examination of Informal Network use by AF forces in Haiti Earthquake of 2010 HA/DR
- Analysis of related Lessons Learned (LL) in Joint Lessons Learned Information System
- Focus on the use of Informal Networks to resolve problems in meeting the Sustainment and Agile Combat Support components of mission

RESEARCH QUESTIONS:

- Use of Informal Networks will resolve logistics-related issues more often than use of Formal Networks during HA//DR
- Informal Networks will be used more often than Formal Networks during HA/DR

METHODOLOGY:

- Qualitative content analysis of LL allowed for interpretation of success/failure of network chosen (Informal Network or Formal Network)
- Data-reduction identified categories of issues that 'triggered' the choice of Informal vs. Formal Network
- Cross-case analysis revealed that network ability to compensate is affected by network choice

Coding Framework

Category	Subcategory	Sub-subcategory
1. Formal		
2. Informal		
3. Triggers		
	3.1 Urgent Need	
	3.2 Coordination (lack of)	
		3.2.1 Faulty Org'l Processes
	3.3 Proper Planning (lack of)	
		3.3.1 Faulty Org'l Knowledge
	3.4 Formal Guidance (lack of)	
	3.5 Communication (lack of)	
	3.6 Own Resources (lack of)	
		3.6.1 Functional Gap in Formal Network
	3.7 Agreement (lack of)	
	3.8 Use of Informal Network as Part of Mission	
4. Logistics		
5. Networking		
	5.1 Communication (functional)	
	5.2 Cooperation (functional)	
	5.3 Coordination (functional)	
	5.4 Evidence of Formal Networking	
	5.5 Evidence of Informal Networking	
	5.6 Information Sharing	
6. Organization Structure		
7. Taking Action		
	7.1 Improvising	
	7.2 Informal actions enabling Formal actions	
		7.2.1 Assuming Responsibility

RESEARCH RESULTS:

- Success of chosen network affected by network choice (r=.087, p=.09)
- Higher number of successful issue resolutions was a result of using an Informal Network
- The trigger, 'Lack of Own Resources' led to use of Informal Networks most often (14 times out of 25 cases)

POTENTIAL BENEFITS

- Awareness that some logistics-related issues may lend themselves to resolution via Informal vs. Formal Networks (e.g., lack of resources)
- Educating crisis response personnel to better exploit their Informal Networks and those of their subordinates

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 074-0188

1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From – To)*
16-06-2011	**Graduate Research Paper**	May 2010 – June 2011

4. TITLE AND SUBTITLE
Use of Informal Networks to Resolve Logistics-related Issues in Humanitarian Assistance/Disaster Response

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)
Muse, Yira Y., Major, USAF

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAMES(S) AND ADDRESS(S)
Air Force Institute of Technology
Graduate School of Engineering and Management (AFIT/EN)
2950 Hobson Street, Building 642
WPAFB OH 45433-7765

8. PERFORMING ORGANIZATION REPORT NUMBER
AFIT/ILS/ENS/11-09

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Intentionally Left Blank

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED.

13. SUPPLEMENTARY NOTES

14. ABSTRACT The social dynamics of informal networks are not well understood in the context of Humanitarian Assistance/Disaster Response (HA/DR). Informal networks are what personnel typically rely on when formal organizational barriers constrain their ability to accomplish the mission. This study examines the use of Informal Networks to resolve logistics-related issues faced by Air Forces Special Operations Command (AFSOC) and Air Forces Southern (AFSOUTH) during their HA/DR to the Haiti Earthquake of 2010. A Content Analysis was conducted of the logistics-related Lesson Learned (LLs) reports submitted by these organizations. The purpose was to determine if there exist any patterns in the LLs that identify situations where it is more beneficial to leverage Informal Networks than to rely on the existing Formal Networks, and to provide insight into the Informal Networks present throughout disaster response organizations. The results suggest that Informal Networks provided successful resolution of issues more often than Formal Networks and they were also used more often than Formal Networks. Hopefully, such insight will enable Air Force leaders to improve their organizational communication during disaster response by properly leveraging their units' Informal Networks.

15. SUBJECT TERMS
Informal Network, Formal Network, Humanitarian Assistance, Disaster Response, Logistics, Haiti

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			Sharon G. Heilmann, Lt Col, USAF (ENS)
U	**U**	**U**	**UU**	78	**19b. TELEPHONE NUMBER** *(Include area code)* (937) 255-3636 x4319

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. Z39-18